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Managing the Battle Rhythm

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C2 Concepts, Theory, and Policy

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14. ABSTRACT
Military personnel understand the concept of the battle rhythm: the cycle the Commander and his staff use to make decisions. The battle rhythm takes in to account sensor and intelligence inputs, battle damage assessments, the effects of fires, logistics and weather concerns, the stated mission of the campaign or operation, direction from higher authority, and the Commander's intent to accomplish the stated mission, and combines these elements to create a series of decisions that impact the actions of units reporting to the Commander. The battle rhythm is the heart of the military's operational knowledge management process. Effectively managing the battle rhythm means effectively processing inputs and intent to allow the Commander to make decisive decisions. The battle rhythm process can be boiled down to four basic phases: receiving input from multiple sources, integrating input to create useable information, shaping useable information to make it actionable, and reaching a decision point. These steps can be adapted to all levels of command: from the strategic down to the tactical, with adjustments made for the rapidity of information flow using technology and processes. Understanding these four phases is the key to mastering the battle rhythm.

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Managing the Battle Rhythm

ABSTRACT

Military personnel understand the concept of the battle rhythm: the cycle the Commander and his staff use to make decisions. The battle rhythm takes in to account sensor and intelligence inputs, battle damage assessments, the effects of fires, logistics and weather concerns, the stated mission of the campaign or operation, direction from higher authority, and the Commander's intent to accomplish the stated mission, and combines these elements to create a series of decisions that impact the actions of units reporting to the Commander. The battle rhythm is the heart of the military's operational knowledge management process. Effectively managing the battle rhythm means effectively processing inputs and intent to allow the Commander to make decisive decisions.

The battle rhythm process can be boiled down to four basic phases: receiving input from multiple sources, integrating input to create useable information, shaping useable information to make it actionable, and reaching a decision point. These steps can be adapted to all levels of command: from the strategic down to the tactical, with adjustments made for the rapidity of information flow using technology and processes. Understanding these four phases is the key to mastering the battle rhythm.

Introduction

Naval war fighters are generally familiar with the Commander's decision and execution cycle better known as the Observe, Orient, Decide and Act (OODA) Loop (figure 1).[1] The four phase process for managing the battle rhythm resides in the "observe" and "orient" phases of the OODA Loop where data is sensed and processed into a common tactical picture and is fused with other information to create situational awareness for the Commander. The four phase process concentrates on ways to improve the flow of information from sensor input to decision point, and helps identify areas where information is stovepiped and not effectively shared across an organization. Understanding where information develops and where it should flow will facilitate creating the business rules for managing information flow to the Commander. This ultimately allows the Commander to make the best decision based on the best information available.
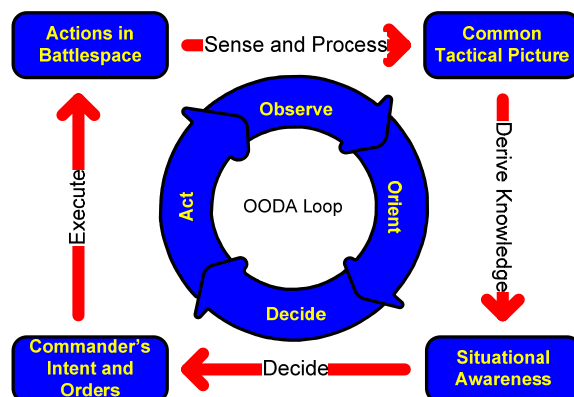

Figure 1: The OODA Loop

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[1] Department of the Navy, <u>Naval Command and Control</u>, Naval Doctrine Publication 6, (Washington, DC: 19 May 1995), 18.

War Fighter's Introduction to Knowledge Management

Prior to describing the four phase process, a few key knowledge management concepts shall be introduced to allow war fighters to become more familiar with the vocabulary of knowledge management. War fighters must first understand the distinctions between data, information and knowledge, and the relationships between Information Technology, Information Management and Knowledge Management.[2]

Data is a representation of facts or concepts that is suitable for communication, interpretation, or processing.[3] In other words, data is the raw unrefined material of information. It is abundant in nature, fresh from the source, but not always necessary for the Commander's situational awareness. Picture a table of ships on a computer display, with each ship's position, course, speed and classification listed. The table also includes a list of sensors organic to a carrier battle group that hold contact on each ship, and the time of the last contact report. From the point of view of the Commander, this table is rich in data, but does not necessarily hold vital information because it is hard to determine the *context* of the data.

Enter information. Information is defined as data that is held in *context*, in other words, data that is discernable as valuable.[4] Picture the same list of ships described above, but now each ship's position is displayed on an electronic chart, each ship's classification is displayed as a colored Navy Tactical Data System (NTDS) symbol, and each ship's course and speed is displayed as a vector line. The ships' data is now quickly discernable as valuable because each ship is displayed in relationship to its proximity to friendly forces or vital land masses. When held in this context, the ships' data becomes more meaningful, and hence becomes information. Note that some of the data may now be buried more deeply in the display. For example, a watch stander may need to click on a ship's symbol to find which organic sensor holds contact and the time of the last contact report. More data is requested only after it is identified as pertinent. This tends to make information less plentiful than data, but more rich in value, hence having a greater likelihood for yielding action.

If data held in context is information, then information that yields action is knowledge; in other words, knowledge is information that is *actionable*. Take three contacts from the chart above, classified as small patrol ships from an unfriendly nation, and operating in the vicinity of a disputed island chain. Intelligence reports indicate a test of resolve is imminent regarding the sovereignty of the island chain. Based on these pieces of information, a decision is made to send a destroyer to investigate the contact's presence near the disputed territory. The information, when

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[2] M. E. Nissen, <u>Harnessing Knowledge Dynamics: Principled Organizational Knowledge and Learning</u>, (Idea Group Publishing 2006); Adapted in Network Warfare Command, "Knowledge Management Module 1, Terms and Definitions," <u>Information Professional 2005 Technical Refresh CD-ROM</u>, 2005, 1.

[3] Department of Defense, <u>Department of Defense Dictionary of Military and Associated Terms</u>, Joint Publication 1-02, (Washington, DC: 14 April 2006), 142.

[4] Network Warfare Command, "Knowledge Management Module 1, Terms and Definitions," <u>Information Professional 2005 Technical Refresh CD-ROM</u>, 2005, 2.

held in context and combined with other information leads to an action, meaning that information can be treated as knowledge.

Another way to view the data, information and knowledge relationship is in the Cognitive Hierarchy Diagram seen below in figure 2.[5] Data is first gathered from raw signals, and is processed into information through filtering, organizing, formatting, etc. Information is transformed into knowledge after it is analyzed, correlated and fused with other pieces of information. The act of integrating various pieces of information is called learning or *cognition*. In other words when we fuse data we learn something new about a situation. Knowledge contributes to understanding when experience, expertise and intuition are applied. The act of using experience to understand what has been learned is called *judgment*. Another way at looking at it, the more experience or expertise you can apply to a piece of knowledge, the better your judgment in that area. Understanding contributes to the Commander's *situational awareness* which creates an environment that facilitates action.[6]
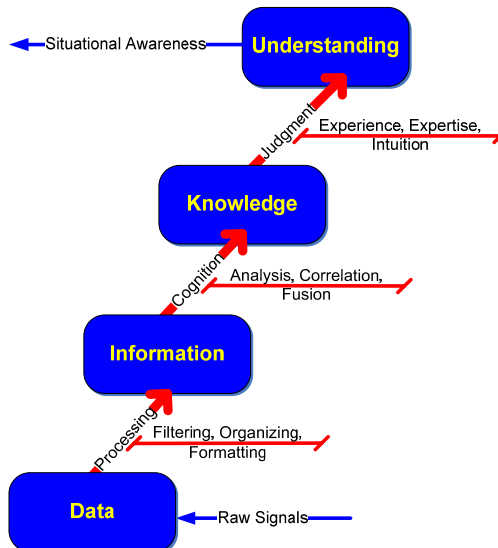

Figure 2: Cognitive Hierarchy

A key fact to remember is that actionable information for a subordinate may only be information for a supervisor. This becomes important when determining what information flows to the Commander during the battle rhythm process.

It is also important to note that there are two types of knowledge; explicit knowledge and tacit knowledge. Explicit knowledge is knowledge that can easily be transmitted from one person to another, usually in the form of manuals, documents and procedures. Tacit knowledge is less easy to describe. It consists of habits and experiences that we cannot articulate but still

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[5] Based on Jeffrey R. Cooper, The Coherent Battlefield Removing the Fog of War: A Framework for Understanding an MTR of the Information Age. Unpublished paper. SRS Technologies, 9 June 1993; quoted in U.S. Department of the Navy, Naval Command and Control, Naval Doctrine Publication 6, (Washington, DC: 19 May 1995), 21.

[6] U.S. Department of the Navy, Naval Command and Control, Naval Doctrine Publication 6, (Washington, DC: 19 May 1995), 20-23.

enable us to make correct decisions.[7] Think of two Naval Officers, one a Navy Captain with twenty years of sea going experience, the other a Lieutenant Junior Grade with two years at sea. If these two individuals were presented with the same manuals and procedures, and the same set of circumstances, the Navy Captain's tacit knowledge of life at sea would make him better equipped than a Lieutenant Junior Grade to handle any contingency. In a sense, the amount of judgment an individual possesses in a certain area of expertise is a good measure of the amount of tacit knowledge and individual possesses.[8]

Three other important distinctions that must be understood is the relationship between Information Technology, Information Management and Knowledge Management.

Information Technology is the wiring, machinery, and software that deal with moving the basic bits and bytes of data from one information system to another. A ship's local area network, the attached computers and communications equipment, and software used to create, view, catalogue and store data are all part of Information Technology.

Information Management is the policies, procedures and business rules used for storing, cataloguing and recalling information saved by an organization. For instance, a policy that states all electronic logs will be accessible via a command's intranet; or, the procedure for retrieving radio message traffic from an email archive.

Knowledge Management is not about technology, but about the way people collaborate with information and share knowledge. It is about allowing knowledge to flow to the right people, identifying stovepipes and bottlenecks, and enabling the right actions to be taken at the right time. This process to manage the Battle Rhythm is a Knowledge Management Process.

Four Phase Battle Rhythm Process

The process of generating actionable information to the Commander can be boiled down to four basic phases. They are: Input - receiving data inputs from multiple sources; Integrate - integrating the multiple inputs to create useable information; Shape - shaping useable information to make it actionable; and, Decide - taking actionable information to the Commander for a decision (figure 3). Each phase consists of five key elements that aid in flowing information from one phase to the next; namely identifying the data injects into the phase, identifying a phase's action officers, identifying a time for the action officers to meet and collaborate, establishing the context that makes the data pertinent information, and generating a deliverable to the next phase.

It is important to note that an action officer may receive actionable information at any point in this process that is not necessary for the next phase, but is critical to another staff function. Also, each phase may generate requests for more information based on that phase's effort to

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[7] Michael Polanyi, "The Tacit Dimension," First published Doubleday & Co, 1966; Reprinted by Peter Smith, Gloucester, Mass, 1983. Chapter 1: "Tacit Knowing".

[8] Network Warfare Command, "Knowledge Management Module 1, Terms and Definitions," Information Professional 2005 Technical Refresh CD-ROM, 2005, 3.

establish context. Both ideas become more important as the process is described.
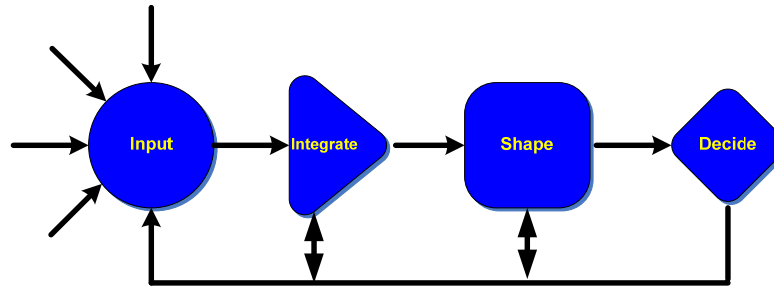

Figure 3: Four Phase Battle Rhythm Process Diagram

Throughout this process description, examples shall be drawn mostly from the operational level of command; specifically, from ships at sea operating in a carrier battle group. Yet this process can be easily applied to all levels of command. Examples shall be given that show how technology, policies and procedures can be used to adjust the process to account for the differences in the speed of information flow at the different echelons of command.

Phase 1: Sensor Input

The sensor input phase is the most data rich, information poor step in the process when viewed from the point of view of the Commander. Raw data is injected into a command and control node such as the Combat Information Center (CIC) of a ship or the Tactical Flag Command Center (TFCC) of a Battle Group Commander's Flag Ship, and is combed constantly for pertinence to the staff. This data can arrive in many forms; such as sensor inputs from a radar or sonar plot, an intelligence report from higher headquarters, a ship's situation report that also states logistics concerns, a battle damage assessment from a reconnaissance aircraft, a weather report from a meteorological center, etc.

Key action officers, in this phase, are watch standers and lower level staff members whose function is to receive and correlate raw data, and process that data into information. This processing occurs at the lowest level of the cognitive hierarchy (see figure 1). At this level of the chain of command, context must be clearly defined based on the *expressed* intent of the Commander and his principal assistants. Typically, this intent is expressed in a set of night orders, battle orders, standing orders or trip wires that direct the watch standers to inform the Commander, a principal assistant, or a subject matter expert when a certain data set is observed. An example is the list of required reports provided in a Commander's Standing Orders. This list may require a report to the Commander for casualties to critical machinery, aircraft crunches, or significant changes in environmental conditions such as visibility. This list may also require a report to a principal assistant or subject matter expert instead of the Commander, depending on the criticality of the information. In every case, the notification chain must be clearly stated.

Ultimately, the watch stander or staff member will make a decision to either ignore data flowing in front of him as not pertinent, watch data more

closely to see if it becomes pertinent, or flag the data as critical information that must be reported up the chain of command as delineated in the expressed intent. This information is actionable at the watch stander level, but is only information for higher levels of the chain of command where integration with other information must occur.

The real strength of this phase is that it will generate information for various staff members and principal assistants who are essentially running mini-battle rhythms inside their own areas of cognizance. This fact becomes significant in the next phase, information integration.

Phase 2: Information Integration

The information integration phase is the most complex phase of the process. Data inputs flow from lower level staff members and watch standers to critical *data consumers* such as the principal assistants and subject matter experts. These data consumers have a deeper understanding of the context surrounding the information they receive. They rely less on the expressed intent of the Commander and more on their own intuition, personal experience and store of knowledge to identify pertinent information and learn something new about the situation.

Data consumers must meet together to share information from their areas of expertise and determine if the shared information is of interest to the Commander. As they meet, they form planning teams that cross administrative organizational lines to ensure critical information is not stovepiped inside one part of the organization. Planning teams may meet on an ad-hoc basis to meet the decision cycle of the situation or events, or may meet in a specified periodicity to respond to a ship's training cycle or the battle rhythm of a higher headquarters.

Planning teams should be chaired by the action officer who holds primary responsibility for developing the courses of action about to be taken; The Maintenance Officer regarding an upcoming repair period, the ASW Officer regarding a possible submarine threat, etc. These action officers set the agenda for the meeting, ensure all appropriate subject matter experts are involved and have the final word on course of action development. These action officers may request more detailed information from the input segment of the process. Subject matter experts then should query their own staffs to provide more data to ensure the full scope of the context is understood.

At the end of this phase, planning teams will produce a set of possible actions based on their understanding of the situation, and the combined expertise of each subject matter expert. Some members of the planning team may be authorized to take action based on the expressed intent of the Commander. For example, the Battle Group Operations Officer may issue orders to all the ships in the strike group to increase their anti air warfare readiness condition based on the receipt of an intelligence report indicating the presence of long range naval bombers from an unfriendly nation operating in the vicinity. The Commander may trust the judgment of his principal assistants to allow delegation of authority, but such delegation should be clearly expressed to his subordinates to ensure that there is no confusion regarding the Commander's intent.

Phase 3: Information Shaping

Information shaping is a short but important step performed by a group of senior decision makers who know the Commander personally, understand his political environment, and are practiced at setting his agenda priorities. They derive their context from their day-to-day interactions with the Commander. They know the Commander's hot button topics, and use their judgment to present information in a context that *the Commander will understand*.

Picture a Commanding Officer who has left a meeting where safety violations throughout the squadron have just been discussed. He shares with his Executive Officer his frustration at being singled out by the Commodore for having the most safety violations in the past six months. The Commanding Officer also states his desire to set the standard in the Squadron for safety investigations. Now picture a safety violation reported the very next day by a junior officer to the Commanding Officer *that does not go through the Executive Officer*. The junior officer may report accurate details of the violation to the Commanding Officer but will still be peppered with questions regarding the status of the investigation. The Executive Officer, who is more privy to the Commanding Officer's political environment and state of mind, would direct the junior officer to focus less on the details of the violation and more on the investigation to prevent the violation from occurring again. While information shaping may not be vital to ensuring the Commanding Officer receives the correct information in a timely manner, information shaping will ensure that the Commanding Officer hears the information in a format that will not cloud his judgment or understanding, and accurately contributes to his situational awareness.

Information shaping can be a formal meeting to smooth details of a plan of action just prior to presenting the information to a Commander, or can be smaller collaboration effort via telephone or email. The idea is to reduce the chance that the Commander will use his judgment to misinterpret the presented information. In time-critical battle rhythms, the information shaping step may be skipped, but recognize that the Commander will be presented information that has not been shaped and vetted by his senior staff, which may have a negative impact on his situational awareness.

Phase 4: Decision Point

The final phase is the Commander's decision point. The Commander reviews the information presented and the courses of action developed and makes a decision; yes, no, give me an alternative, give me more information, or do nothing. If information from each phase has been properly managed, then the commander has all the information required to make a decision.

Battle Rhythm Process Examples

Three examples shall be used to demonstrate how the four stage battle rhythm process should work. The examples attempt to track a single critical piece of data from its origin, through it processing and integration, and into the Commander's situational awareness. Table 1 provides a summary of each stage of the battle rhythm process; Input, Integration, Shaping and Decision, with each of its five critical elements; data injects, action officers, collaboration time, establishing context and deliverables.

	Input	Integrate	Shape	Decide
Data Injects	– Raw Sensor Data – Intelligence Reports – Unit Situation Reports – Orders from HHQ	– Watch Standers Reports – Information Reports	– Plan of Action – Set of Decisions	– Final Plan of action or set of decisions for the Commander.
Action Officers	– Watch Standers – Lower Level Staff Members	– Principal Assistants – Subject Matter Experts	– Principal Assistants – Senior Decision Makers	– The Commander
Collaboration Time	– Continuous	– Periodic to meet the operational cycle – Ad Hoc to respond to specific issues	– Prior to presentation to the Commander	– As required.
Establish Context	– Expressed Intent	– Action Officer's Tacit Knowledge & Experience	– Personal relationship with the Commander	– Commander's Tacit Knowledge & Experience
Deliverable	– Information Report to Commander, Principal Assistant, Subject Matter Expert	– Plan of Action – Set of Decisions	– Refined Plan of Action – Final Set of Decisions	– Yes – No – Develop alternative – Get more information

Table 1: Battle Rhythm Process and Key Element Table

Operational Example: The Weather Report

A Carrier Battle Group is operating in the open ocean. A watch stander in TFCC receives a weather report stating that high winds and thunderstorms are predicted 300 nautical miles away from the battle group's operating area. The watch stander refers to the Commander's Standing Orders to determine if the weather report is valuable. In other words the watch stander uses the expressed intent of the Commander as the context to verify the report's value. The standing orders state that all adverse weather reports within 100 nautical miles of the battle group operating area must be reported to the Commander and his senior staff officers immediately, but that all weather reports in the region, regardless of severity, should be forwarded to the Staff Oceanographer for review. Based on this context, the watch stander forwards the weather report to the Staff Oceanographer and not to the Commander and his senior staff.

Phase 1 for the weather report is complete. Note that in the cognitive hierarchy, the weather report has just passed from raw data and has been processed by the watch stander as information to a key staff member. Also note that the weather report, combined with the context of the standing orders created an actionable condition for the watch stander. The weather report is still only information for the Staff Oceanographer and is simply raw data for the Commander.

The Staff Oceanographer reads the report and plots the predicted location on a chart. She notices that the weather will occur along the battle group's track to their next liberty port. She also notes that predictions for this particular storm have been getting progressively worse over the past 72 hours. The Oceanographer decides the information is important enough to present at the next Strike Group "Bubbas" Meeting. Using her expertise, experience and accumulated knowledge the Oceanographer has learned that the storm will impact the battle group's operations. For the Oceanographer, cognition has occurred and the storm is now part of her

situational awareness. An actionable condition has been created and the Oceanographer makes a decision to inform others. Note that the Oceanographer is running her own mini-battle rhythm; she receives reports as raw data, she filters, organizes and correlates the report to find data that is valuable, she learns information and makes a decision. This would not be possible unless she had deeper understanding that comes with more in depth training inside her staff area of expertise. She is also able to make a decision without relying on written guidance from the Commander. Also note that the information is not so time-critical that the Oceanographer immediately drives for a meeting, she waits and utilizes a recurring meeting to share the information with other subject matter experts. Finally, the storm, when held in context with the battle group's track and the progressively worsening forecast, is actionable information and therefore knowledge for the Oceanographer. For the Commander, the accumulation of information about the storm *plus* the battle group's track is valuable data therefore information.

The "Bubbas" meeting is an operational planning team that meets three times a week to discuss the strike group schedule and other important issues. The team consists of subject matter experts from across the staff and strike group, and is chaired by the Staff Operations Officer. At the meeting, the Oceanographer reports that the storm's track will impact the battle group's projected track to their next liberty port and recommends rerouting the track. She also states that rerouting the track may delay or cancel the battle group's arrival at the liberty port. Subject matter experts discuss the storm's further impact on training evolutions, fuel requirements, the need for repairs, morale, etc. The Maintenance Officer notes that critical parts and technical experts will be waiting in the next port to perform upgrades to the fire control suites of two ships that cannot be performed at sea. Based on these inputs the Staff Operations Officer decides that canceling the port visit will cause more harm than good. He also decides to wait for more information before delaying the port visit, but directs that a new track be plotted based on the Oceanographer's recommendation, and that notifications be sent to port officials to expect a possible delay.

Phase 2 is now complete. Note that in the cognitive hierarchy the weather report has been analyzed and correlated as important by the Staff Oceanographer, and has been fused with information from other subject matter experts during the "Bubbas" meeting to allow the Operations Officer to learn something new, that the port visit will be impacted, but should not be cancelled. That information has become actionable to the Operations Officer and now can be considered knowledge.

Prior to informing the Commander of the possible delay to the next port visit, the Operations Officer takes his plan of action to the Chief of Staff The Chief of Staff knows the Commander is very cautious with regards to weather and will probably want to see the raw data. He also knows that the Commander has been talking twice daily with the Fleet Commander regarding an upcoming exercise with an allied nation that has deep political impact both in Washington DC and in the capitol of the allied nation. The Chief of Staff states that delaying rather than cancelling the port call is the right decision and recommends that the Operations Officer bring the Oceanographer along to further brief the Commander if required. The Chief of Staff also tells the Operations Officer to emphasize the importance of completing the in port maintenance prior to the upcoming exercise.

Phase 3 is complete; the Chief of Staff shaped the information to ensure that the Commander's judgment would not be clouded by extraneous or

unimportant facts. In the cognitive hierarchy, information shaping helps ensure that the Commander understands all the information being presented, and that the information contributes to his situational awareness.

The Operations Officer informs the Commander that a bad storm will intersect the battle group's track in two days, which may delay the battle group's arrival at the next liberty port. He also states that the Oceanographer is tracking the situation closely and will keep all informed. Finally he reports that a delay is preferable to cancellation because critical maintenance must be done in port to support the upcoming exercise. The Commander concurs with the decision, but asks to see the raw data as it becomes available. A decision is made, phase 4 is complete, the Commander understands the impact of the storm on future operations and the storm report has become a part of his situational awareness.

A summary of this examples phase and critical elements are shown in Table 2.

	Input	Integrate	Shape	Decide
Data Injects	– Weather Report	– Weather Information Report	– Plan to delay the port visit	– Refined plan to delay the port visit
Action Officers	– TFCC Watch Stander	– Oceanographer and other Subject Matter Experts – Operations Officer	– Operation's Officer – Chief of Staff	– The Commander
Collaboration Time	– Continuous	– Weekly Bubba's Meeting	– Prior to presentation to the Commander	– When presented by Operations Officer
Establish Context	– Commander's Standing Orders	– Oceanographer's and other Action Officers' Tacit Knowledge & Experience	– Exercise Importance	– Commander's Situational Awareness
Deliverable	– Weather Information Report to Oceanographer	– Plan to delay the port visit	– Plan highlights importance of repairs on upcoming exercise	– Concur with plan as presented

Table 2: Operational Example: Battle Rhythm Process and Key Element Table

Tactical Example: The Submarine

The process can be applied to a more tactical decision and execution cycle by adjusting procedures and using technology to account for a more rapid flow of information and a smaller sized staff. Picture a fast attack submarine, on deployment, underway in the open ocean, enroute to a rendezvous with a carrier battle group.

A sonar operator receives indication of another submarine on his sonar plot. The sonar operator immediately calls out, "Tripwire! Possible submerged contact" and gives a relative position to the contact from the sub. Tripwires are a set of conditions or reports, promulgated by the Captain in his Night Orders that must immediately be reported to the Commanding Officer. They are memorized and reviewed constantly on watch.

The Sonar Supervisor looks at the sonar plot, confirms the indication, but is not sure if it is a real submarine. He immediately announces tripwire to the Officer of the Deck.

The Officer of the Deck orders the messenger of the watch to inform the Commanding Officer and Executive Officer. The Officer of the Deck then reviews the sonar plot with the Sonar Supervisor. Intelligence and operation reports do not indicate any other submarines are underway. The Officer of the Deck is skeptical that the contact is a submarine but he maneuvers the ship in accordance with current doctrine and guidance.

The Executive Officer and Commanding Officer arrive about the same time. Both review the sonar plot. The Executive Officer thinks it is a submarine, but the Commanding Officer recognizes the trace as a very quiet surface contact that has fooled many people in this area of the world. He then orders the Officer of the Deck to go to periscope depth and look at the contact to verify.

This example shows how each phase melds smoothly from one into the other at the tactical level (tables 3). The sonar operator passed information quickly based on the Commander's expressed guidance, as did the Sonar Supervisor and the Officer of the Deck; a phase 1 activity. The Officer of the Deck made a skeptical assessment about the veracity of the information presented because other information indicated that no other submarines should be in the vicinity: a phase 2 activity. Phase three was skipped; it was not needed and shaping the information would not have improved the Commanding Officer's situational awareness. In phase 4 the Commanding Officer, based on his own experience and knowledge, interpreted the information differently, but would not have been able to unless the Officer of the Deck and the Sonar Supervisor had integrated intelligence and operations reports. Note that the Officer of the Deck still maneuvered the ship as if the indications were true. That action was based on expressed guidance and tactical manuals. This action was correct because it was based on the *best information available*.

	Input	Integrate	Shape	Decide
Data Injects	– Sonar Contact Report	– Tripwire Report		– Maneuvers IAW Doctrine
Action Officers	– Sonar Operator	– Sonar Supervisor – Officer of the Deck – Executive Officer – Commanding Officer		– The Commander
Collaboration Time	– Continuous	– Immediate, in the Control Room		– Immediate, in the Control Room
Establish Context	– Tripwires from Commanding Officer's Night Orders	– Intelligence Reports		– Commander's Tacit Knowledge & Experience
Deliverable	– Tripwire report to Sonar Supervisor, Officer of the Deck, Executive Officer and Commanding Officer	– Maneuvers IAW doctrine		– Complete maneuver, – Get more information

Table 3: Tactical Example: Battle Rhythm Process and Key Element Table

How did this contact report flow through the cognitive hierarchy? The raw sonar contact data was processed as valuable based on the expressed intent of the Commanding Officer and was identified as critical information by the code word "Tripwire". The sonar contact information was then

correlated with intelligence and operations reports to allow learning, in this case that the possibility of the possible submerged contact was highly unlikely. Based on that knowledge, the Commanding Officer used his expertise to determine that the contact data was similar to a submerged contact, but also may be a quiet surface contact. With this understanding he orders the Officer of the Deck to go and verify the contacts classification with a visual confirmation.

Strategic Example: COMPACFLT Joint Task Force Battle Rhythm Tool.

Whenever the Pacific Fleet Commander(COMPACFLT) is designated a Joint Task Force (JTF) Commander by U.S Pacific Command (USPACOM), the staff relies on the COMPACFLT JTF Battle Rhythm Tool (figure 4) to track the complex flow of information across the many echelons of command. The COMPACFLT JTF Battle Rhythm Tool incorporates guidance and direction from higher headquarters, the JTF Commander's intent to accomplish assigned missions, and the requirements of subordinate units to complete planning, preparation and execution for any given set of tasks. The battle rhythm tool acts like a warehouse with glass floors, storing important information products in a repository and giving each echelon of command visibility into the staff and unit activities from echelons both above and below.[9]
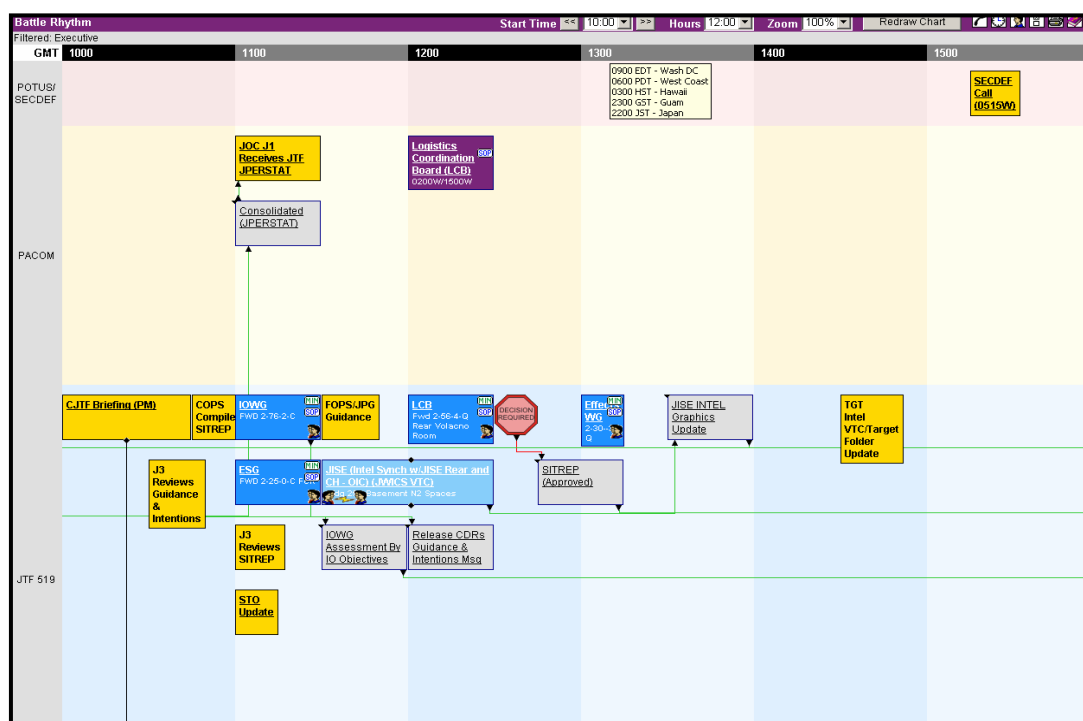
Figure 4: COMPACTFLT Battle Rhythm Tool Graphical Display

The display is divided into four distinct tiers. Tier-Zero represents the National Command Authority (NCA), which consists of the President of the United States, the Secretary of Defense and the Joint Chiefs of Staff. Tier-One represents the Combatant Commander and his staff at USPACOM. Tier-Two represents COMPACFLT as the JTF Commander, and Tier-Three represents the JTF

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[9] Collaboration at Sea Development Team, "Battle Rhythm User's Guide," Unpublished Users Guide, Commander United States Pacific Fleet, Pearl Harbor, Hawaii: 2006, 2.

Functional Component Commanders. Decision points are clearly marked throughout the display, including inputs required to make a decision and individuals responsible for the actual decision.

The battle rhythm tool uses two components to track the flow of information: m*eetings*, where action officers meet to collaborate, and *products*, the results of meetings. Products can be formal reports, meeting minutes, action items, intentions messages, etc. Meetings can include multiple participants from multiple tiers or can be very small and specific. The tool maintains meeting discipline by requiring a purpose and an agenda to be registered prior to authorizing the meeting. The battle rhythm tool can display the battle rhythm for a single individual, or for clusters of individuals.

COMPACFLT has been designated as the JTF Commander for a multi-national, combined arms, joint exercise hosted by USPACOM. The JTF Indications and Warning (I&W) Cell meets every six hours (0500, 1100, 1700, 2300) with representatives from each functional component commander to review their intelligence and surveillance inputs. The JTF I&W Cell sends its meeting results as a product called the hostility index up to the JTF Commander's Intentions Board, who them incorporates the product into the JTF Commander's Daily Intentions Message (DIM). The JTF Commander's Intention Board normally meets once at noon to draft the DIM for the next day, and once at 1800 to approve the final message. A variety of other cells and boards meet throughout the day to support the Commander's decision cycle, including the Rules of Engagement (ROE) Cell. The Commander receives a brief from his principal assistants at 0700 and 1700 daily. Figure 5 shows the battle rhythm described above.
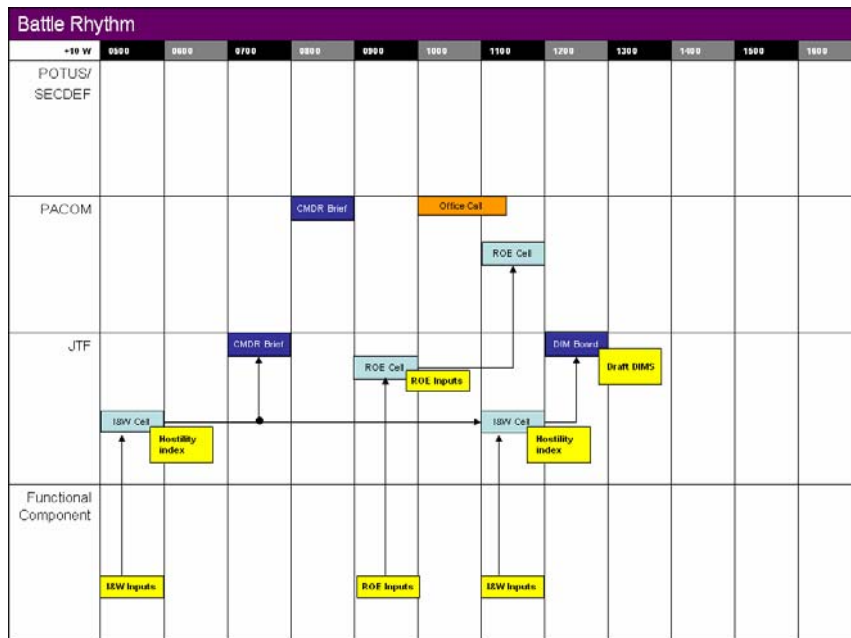

Figure 5: Battle Rhythm Example

At 0300, The Joint Forces Maritime Component Commander (JFMCC) Intelligence Watch receives indications that all opposing force submarines are leaving for sea. Based on her night orders she reports the information to the JFMCC Battle Watch Commander the JFMCC Intelligence Officer and to the

JTF Commander's Intelligence Watch, who recognizes from *his* night orders that a significant change in opposing force submarine posture is a critical information requirement that must be immediately reported to the JTF Intelligence Officer. Note this is a phase one activity that is occurring across the echelon divide, both watch standers refer to the expressed intent of the JTF Commander to determine if the information is valuable.

The JTF Intelligence Officer shows concern for the report and immediately re-schedules the I&W Cell's first meeting for 0400. As part of the agenda, he posts the report from the JFMMC Intelligence Watch and states that he wants to determine if the hostility index has risen. This is a phase two activity. Note a key phase two activity is controlled by the battle rhythm tool; determining when to collaborate.

At 0400 the JTF I&W Cell meets to discuss the significance of the submarine report. The JTF Intelligence Officer chairs the meeting and asks if any of the other representatives from the JFMCC, the Joint Force Air Component Commander (JFACC), and the Joint Forces Land Component Commander (JFLCC) have increased indication of opposing force preparations to conduct hostile action. The JFACC has noted an increase in opposing force air patrols near logistic air routes over the last 48 hours and the JFLCC notes a significant drop in opposing force radio communications. Based on these indications the JTF Intelligence Officer decides to issue a heightened hostility index. He also notes from the battle rhythm tool that the JTF Commander has an Office Call with the USPACOM Commander at 1000. He includes the assessment and reports from all three component commanders' representatives in the I&W Cell's meeting minutes as well as the updated hostility index, then schedules a meeting with all the principal assistants at 0630 to update the assistants prior to their brief with the Commander at 0700.

At 0630 the principal assistants meet and phase two quickly merges into phase three. All the principal assistants have reviewed the minutes from the I&W Cell meeting and are prepared to discuss the implications. The JTF Commander's Chief of Staff chairs the meeting and starts off with the Intelligence Officer's report; no further indications of imminent hostile action have been noted, but the political rhetoric coming from the opposing force is increasing in intensity. The principal assistants all agrees that the situation is ambiguous but feels closer to hostile action. They decide to send a radio message to all task force units warning of the possibility of hostile action. The Operations Officer, however, warns that the USPACOM Commander is interested in testing the Joint Task Force's ability to influence the strategic message; therefore care must be taken to ensure unit preparations do not precipitate hostile action. The JTF Judge Advocate General (JAG) states that he will review the Standing ROE with his counter parts at each of the functional components during his normal cell meeting at 0900. The JAG knows that his counterparts will have enough time to brief their respective staffs and return with good inputs by 0900. Shaping and integration have smoothly moved from one phase to the next. This isn't unusual since the principal assistants are integrating their information, but are also involved in shaping the information for the Commander's review.

The principal assistants brief the JTF Commander at 0700. The Commander decides to send the warning message with a simple statement to avoid actions that might precipitate hostility, but under no circumstances give up the right of self defense. He concurs with the ROE review and asks

to be given an update once it is complete. He also states that he will review his actions with the PACOM Commander.

	Input	Integrate	Shape	Decide
Data Injects	– Submarine Sortie Report	– CCIR	– Higher hostility index	– Plan of Action – Send a warning message – Review ROE
Action Officers	– Intel Watch Stander	– JTF Intelligence Officer – Operations Officer	– Principal Assistants – Chief of Staff	– The Commander
Collaboration Time	– Continuous	– I&W Cell	– Prior to Commander Morning Brief	– Morning Brief
Establish Context	– Commander's Critical Information Reports (CCIR)	– Other indications of hostility	– Strategic Communications	– Commander's Tacit Knowledge & Experience
Deliverable	– CCIR up to next tier	– Higher hostility index	– Plan of Action – Send a warning message – Review ROE	– Send message – Highlight non escalation and self defense – Review ROE – Brief USPACOM

Table 4: Strategic Example: Battle Rhythm Process and Key Element Table

Table 4 summarizes the flow of data across each phase. At the Strategic level, the decision cycle is very complex. Multiple inputs from many different activities, both above and below the chain of command must be filtered, correlated, analyzed and integrated to give the Commander an accurate picture of the events occurring in his area of responsibility. The COMPACFLT battle rhythm tool improves his situational awareness by keeping his staff aware of the information flow throughout the entire task force.

Making the Process Work

The four phase process for managing the battle rhythm does not fix all problems dealing with information flow in an organization, but helps identify areas where information is stovepiped and not effectively shared. Additionally, the process is not meant to be followed in a step by step, cookbook manner, but should be used as a tool to understand the flow of information. What follows next are some stumbling blocks that hinder information flow.

Poor or no expressed intent – The expressed intent from the Commander regarding the flow of data is the most critical aspect of the first phase and should be treated as explicit knowledge. Even experienced watch standers rely on their Commander's Night Orders, Standing Orders, Battle Orders and Intentions Messages to understand which reports should be made to which subject matter expert or principal assistant. The expressed intent must be reviewed in its various forms to ensure that it is current and pertinent for the situation. It should be sufficiently detailed to provide adequate guidance to inexperienced watch standers, yet should leave enough flexibility to allow more experienced watch standers to use their judgment regarding the flow of data to appropriate personnel. Note that as the Commander grows in his billet, his expressed intent regarding data flow may change. The expressed intent should be a living, breathing document that changes as events and even the Commander changes.

Poorly identified subject matter experts – Identifying subject matter experts is a critical aspect of phase two. While most subject matter experts

will be identified by billet, organizations should consider including staff members, who have skill and experience in a certain area, in the reporting chain even if the information reported lie outside that staff members primary responsibilities. For instance an Administration Officer on Strike Group Staff whose last tour was as an ASW tactics instructor may provide some key insights on how to employ ASW Aircraft during a submarine prosecution and should be included in the reporting chain for submarine related reports.

Too many meetings / not enough meetings - Another critical element is determining when and how often collaboration should occur. Meetings should take place with enough frequency to feed the Commander's decision cycle, but not so often that subject matter experts are unable to learn new knowledge from their data streams because they spend all their time in meetings. Cognition requires study. Periodic meetings should not take place just because they are on the calendar, and if they do, they should be short. Conversely, ad hoc meetings should not be avoided because they are not scheduled, however they should occur with a set goal or agenda in mind. Ultimately the collaboration should yield a result; a schedule change, a set of orders, a plan of action, or a decision to find out more information. If meetings are not yielding concrete results then review the reasons for having the meeting, the agenda, and the invited participants and make adjustments as required.

Not shaping the information – Two potential pitfalls in the Shaping Phase are time and lack of knowledge of the Commander. In a battle rhythm stressed by time factors, shaping may occur concurrently with presentation of a plan of action to the Commander. However, the right subject matter experts should be on hand to answer the Commander's questions and ensure his judgment is not clouded by a false understanding of the situation. Commanders and staffs that are new to each other also require a breaking in period to ensure both understand the personality and strengths of the other. Raymond Spruance and the staff he inherited from Bull Halsey, suffered high casualty rates a Midway not because of enemy action, but because the staff was used to Halsey checking their calculations and staff work. Spruance, on the other hand was surprised at what he interpreted as the slip shod way staff work was handled. Their poor collaboration resulted in nearly half of the Enterprise's dive bombers crashing in the ocean due to low fuel; none were lost due to enemy action![10] If there had been more time for the Commander to get to know his staff, and vice versa, far less loss would have resulted.

Conclusion

Battle rhythms can be fast or slow. They can be highly automated and structured or asynchronous and chaotic. But the battle rhythm must manage the flow of information to the Commander and allow the Commander to make decisions effectively. To be effective, the entire staff must understand their role in getting information to the Commander.

Staff members and watch standers, who constantly watch the data stream for pertinent information, must have their context specifically articulated. They must understand that their role is to get information to the Commander and or his subject matter experts in a timely manner. They are the gateway, or input into the battle rhythm process.

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[10] Thomas B. Buell, The Quiet Warrior: A Biography of Admiral Raymond A. Spruance, Little, Brown and Company, Boston, MA 1987: pp 136, 149-150.

Subject matter experts across the organization must meet together often to integrate data received from their respective data inputs. Their role is to use their expertise to provide a context for the Commander and, if required, develop a set of courses of action. They integrate the multiple data streams to create useable information and prepare the details of the Commander's decision.

Information shapers take information that has been integrated and ensure the context is understood by the Commander. Their role is to use their knowledge of the Commander to ensure information is presented in a way that guarantees his understanding.

The Commander reviews the information presented and the courses of action developed and makes a decision. If information from each phase has been properly managed, then the commander has all the information required to make a decision.

What is knowledge for the watch stander is information for the subject matter expert and only data for the Commander. As you progress up the chain of command, context and cognition relies less on explicit knowledge and more on the tacit knowledge of the experts.

These steps can be adapted to all levels of command; from the strategic down to the tactical. Adjustments must be made for the rapidity and breadth of data flow, but the same principles will apply. Understanding these four phases is the key to mastering the battle rhythm.

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AUTHOR'S BIOGRAPHY

Ramberto Torruella is the Staff Knowledge Manager for Commander Battle Force Seventh Fleet, embarked aboard USS KITTY HAWK (CV-63), home ported in Yokosuka, Japan. He graduated from the United States Naval Academy in 1992 with a Bachelor of Science in Physic and from Rensselaer Polytechnic Institute in 1999 with Master of Science in Computer Science. He is a certified nuclear engineer and has served aboard three fast attack submarines in both the Atlantic and Pacific Fleets. Ramberto currently resides in Zushi, Japan with his wife, Kristyne and their four children.

Managing the Battle Rhythm

Ramberto Torruella

CTF-70 Battle Force Seventh Fleet

I-132

Introduction

- Understanding the Battle Rhythm
- Battle Rhythm & Knowledge Management
- Four Phase Process to Improve the Battle Rhythm
- Avoiding Pitfalls in the Process
- Conclusion

Understanding the Battle Rhythm
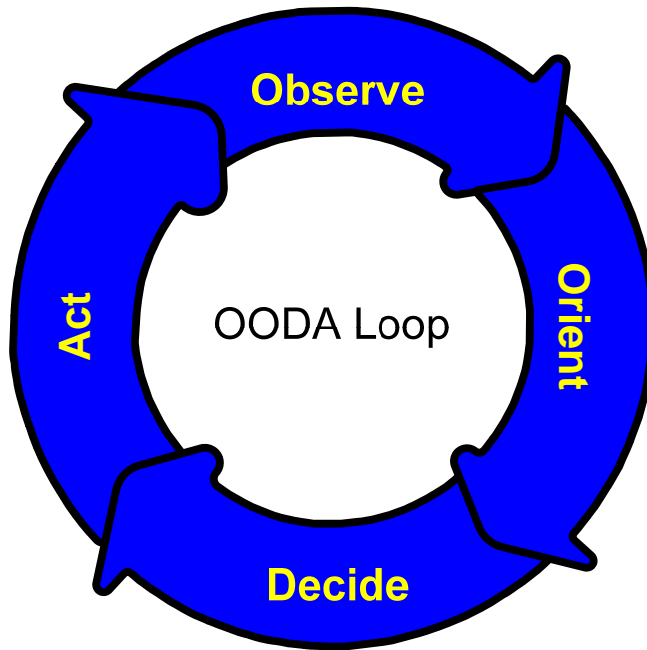
- Battle Rhythm: The Commander's Decision & Execution Cycle
- Also known as the Observe, Orient, Decide and Act (OODA) Loop[1]

[1] Department of the Navy, Naval Command and Control, Naval Doctrine Publication 6, (Washington, DC: 19 May 1995), 18.

Understanding the Battle Rhythm
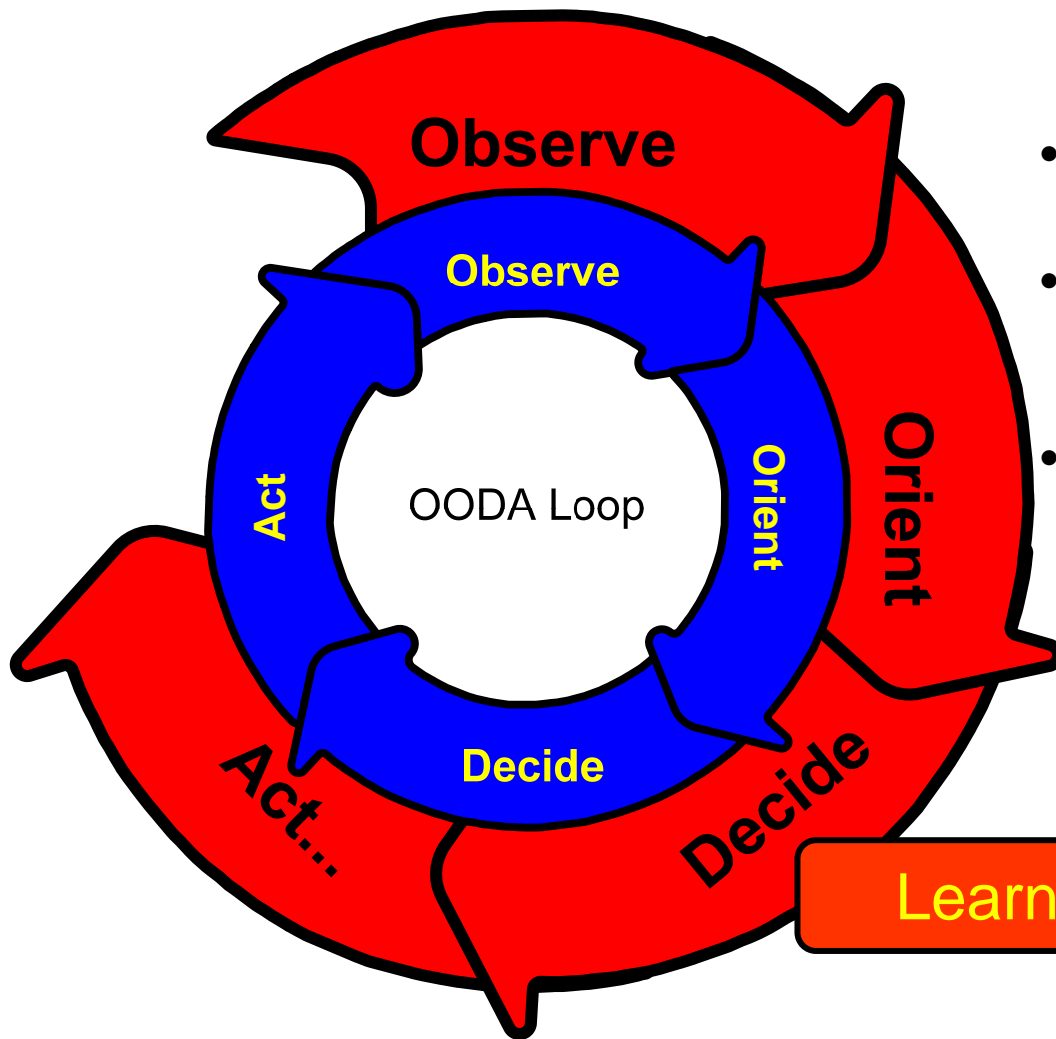
- Battle Rhythm: The Commander's Decision & Execution Cycle
- Also known as the Observe, Orient, Decide and Act (OODA) Loop
- Key to Success on the Battlefield is for your OODA Loop to be inside of the Enemy's OODA Loop

Learn Faster than Your Enemy!

Battle Rhythm & Knowledge Management

- Battle Rhythm is the heart of military operational knowledge management

- Effective management means efficiently processing inputs and intent to allow the Commander to make decisive decisions

- War fighters must understand the distinction between data, information and knowledge

Battle Rhythm & Knowledge Management

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PIB548109415	5/19/2007 10:28:00 AM	1.06666666666667	104.216666666667	-1	-1
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C7F547830925	5/19/2007 4:50:00 PM	25.15	121.766666666667	237	0

Record: 1 of 859

- Data
  - Raw unrefined representation of facts or concepts
  - Typically abundant, but not every piece is relevant
  - Does not hold value because it is hard to determine the *context*

Data Example
Table of Ships with their Course, Speed and Position
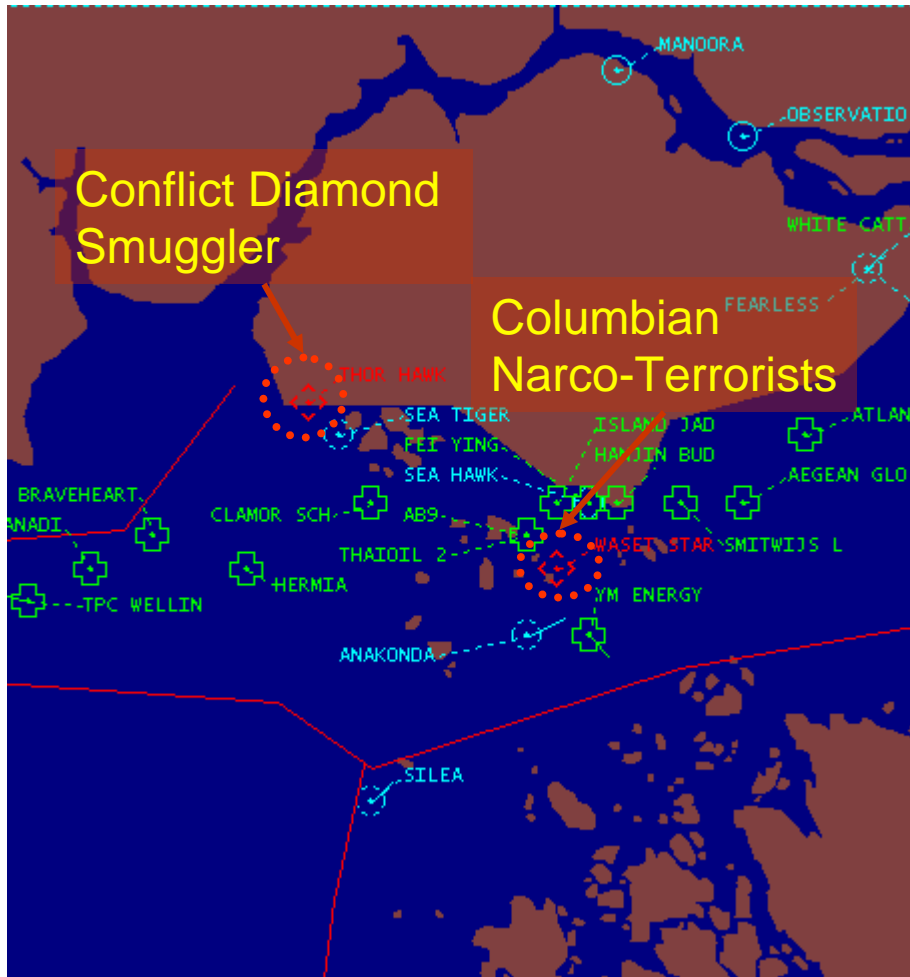
Battle Rhythm & Knowledge Management

- Information
  - Data that is held in *context, i.e.* that is discernable as valuable
  - less plentiful than data, but more rich in value
  - has a greater likelihood for yielding action

Information Example
Same Ships, Displayed on a Chart in Relationship to Land

Battle Rhythm & Knowledge Management

Conflict Diamond Smuggler

Columbian Narco-Terrorists

- Knowledge
 - Information that allows action (or is *actionable*) is knowledge

Knowledge Example
- Two ships carrying illegal cargo
- Intelligence estimate they are meeting North Korean Agents in Singapore

Battle Rhythm & Knowledge Management

- Knowledge Management is *not* about technology
  - About collaborating and sharing information and knowledge
  - About flowing information to the right people
  - About identifying stovepipes and bottlenecks
  - About enabling the right actions to be taken at the right time
  - About creating good Situational Awareness so the Commander can make effective decisions

OODA Loop

Observe

Orient

Decide

Act
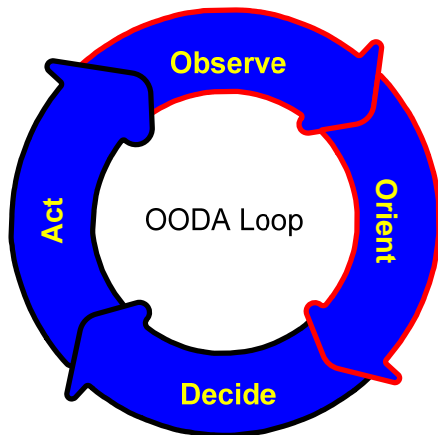
- Improving The Battle Rhythm
  - Concentrate on Observe and Orient
  - Areas heavily impacted by the staff

Four Phase Process to Improve the Battle Rhythm

Receiving data inputs from multiple sources

Input

Integrating the multiple inputs to create useable information

Integrate

Shaping useable information to make it actionable

Shape

Taking actionable information to the Commander for a decision

Decide
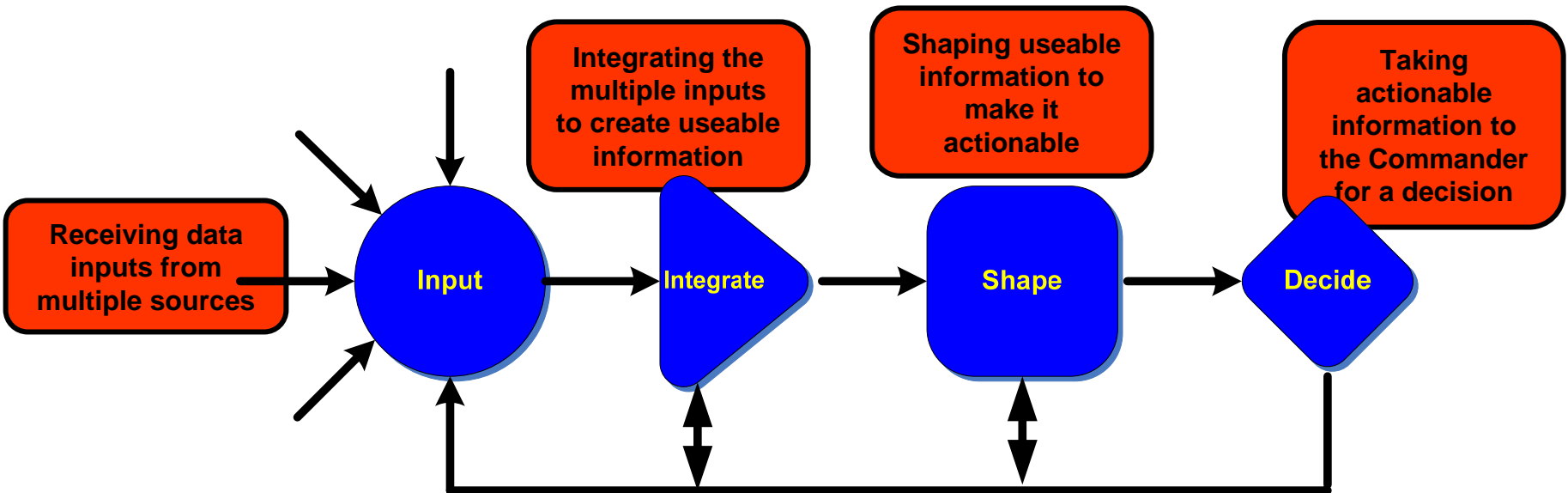
Phase Elements
1. Identifying the data injects
2. Identifying action officers
3. Identifying a time to meet and collaborate
4. Establishing the context that creates valuable data
5. Generating a deliverable to the next phase.

Four Phase Process to Improve the Battle Rhythm

Message Traffic
•Situation Reports
•Logistics Reports
•Readiness Reports
•Casualty Reports

Sensors
•Radar
•Sonar
•Visual
•ISR Assets

Higher Headquarters Intentions
•Orders
•Requests for Information

Input

Environmental Factors
•Weather Reports
•Tactical Oceanography

Operational Factors
•Training Requirements
•Inspection Results
•Exercise Participation

Expressed Intent
•**Night Orders**
•**Standing Orders**
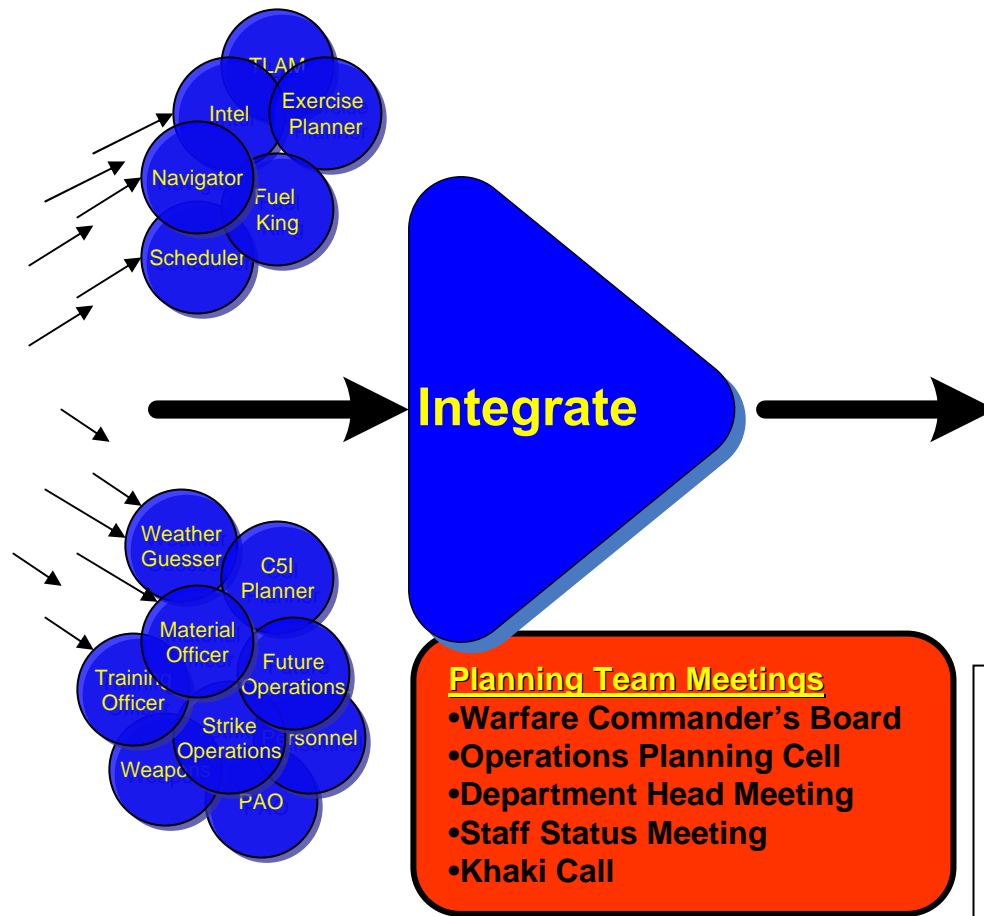•**Battle Orders**
•**Tripwires**

Sensor Inputs

- Data Rich/Information Poor
- Requires *Expressed Intent*
  – Establishes context at this level of the Chain of Command
  – Provides guidance to watchstanders
  – Identifies important information
  – Identifies where information goes

Phase Elements
1. Data injects through CIC (C2 Node)
2. Watchstanders are action officers
3. Collaboration occurs continuously
4. Expressed Intent establishes context
5. Information passed to staff subject matter expert

Four Phase Process to Improve the Battle Rhythm

Integrate

Information Integration

- Most complex phase
- Inputs to Subject Matter Experts
  - Rely on tacit knowledge for context
  - Must collaborate together
- Form Planning Teams
  - Primary action officer chairs
  - Teams cross organizational lines
  - Meet as often as required

TLAM · Intel · Exercise Planner · Navigator · Fuel King · Scheduler

Weather Guesser · C5I Planner · Material Officer · Future Operations · Training Officer · Strike Operations · Personnel · Weapons · PAO

Planning Team Meetings
- Warfare Commander's Board
- Operations Planning Cell
- Department Head Meeting
- Staff Status Meeting
- Khaki Call

Phase Elements
1. Data injects from watchstanders or other sources
2. Subject Matter Experts / Principal Assistants are action officers
3. Periodic to meet the operational cycle / Ad Hoc to respond to specific issues
4. Action officer's tacit knowledge & experience establishes context
5. Plan of Action / Set of Decisions

Four Phase Process to Improve the Battle Rhythm

Information Shaping

- Short but important phase
- Use personal relationship for context
  - Understand political environment
  - Set Commander's agenda
  - Know hot button topics
- Shape information to prevent misunderstanding

Shape

Requires Understanding the Commander
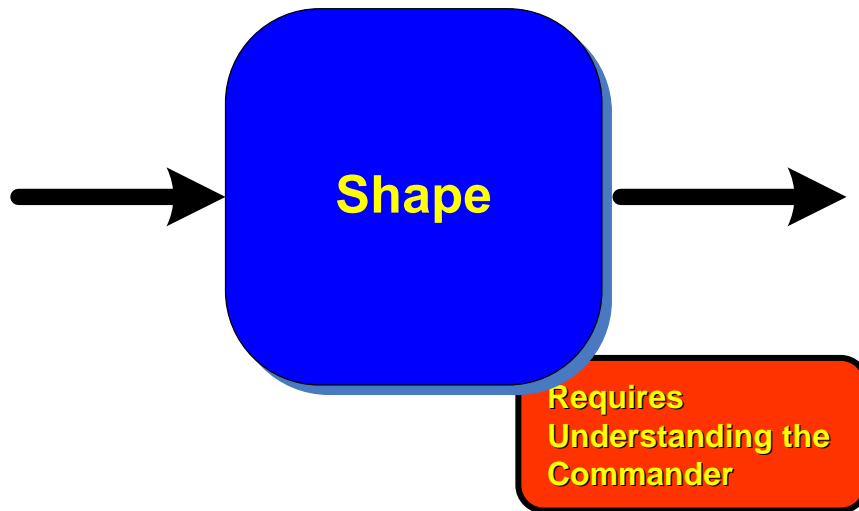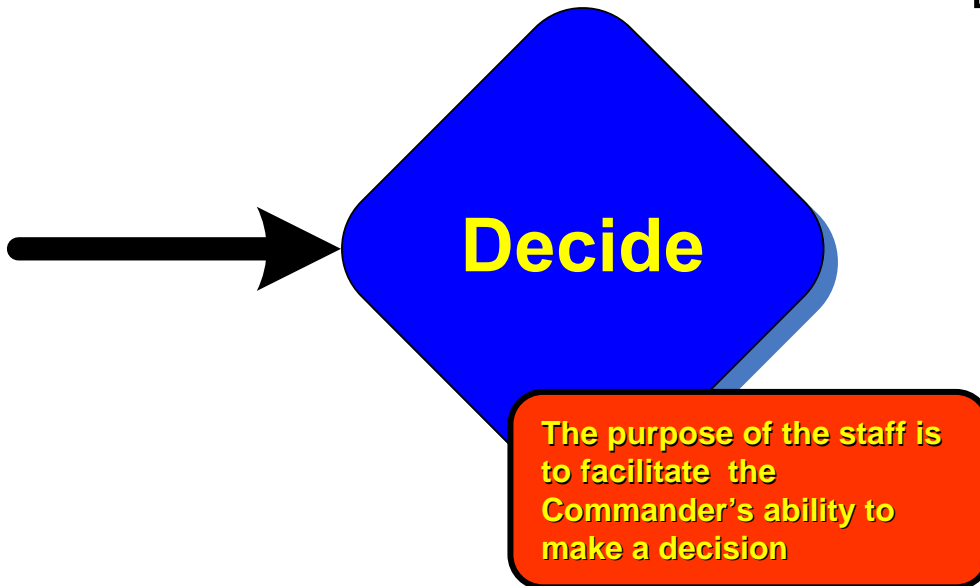
Phase Elements
1. Plan of Action / Set of Decisions
2. Principal Assistants / Senior Decision Makers are action officers
3. Collaboration occurs prior to presentation to the Commander
4. Personal relationship with the Commander establishes context
5. Refined Plan of Action / Final Set of Decisions

Four Phase Process to Improve the Battle Rhythm

Decision Point

- Final Phase
- Decision is made
  - Yes
  - No
  - Give me an alternative
  - Give me more information
  - Wait (Do Nothing)

Decide

The purpose of the staff is to facilitate the Commander's ability to make a decision

Phase Elements
1. Refined Plan of Action / Final Set of Decisions
2. The Commander
3. As required.
4. Commander's Tacit Knowledge & Experience
5. Final Decision

Avoiding Pitfalls in the Process

- **Poor (or no) expressed intent**
  - Must be current and pertinent
  - Sufficiently detailed yet flexible
  - Living breathing document
- **Poorly identified subject matter experts**
  - Look beyond billet structure to staff member experience
- **Too many meetings / not enough meetings**
  - Do not be driven by the calendar
  - Cognition requires time
- **Not shaping information**
  - Time: subject matter experts must be on hand to answer questions
  - New Commander

Conclusion – The Battle Rhythm Must

- **Manage the flow of information to the Commander**
- **Allow the Commander to make decisions effectively.**

The entire staff must understand its role in getting information to the Commander

- Watch standers, constantly watch the data stream and must have their context specifically articulated. They flow data to subject matter experts.

- Subject matter experts must meet together to integrate information and use their expertise to provide a context for the Commander. They develop a set of courses of action.

- Information shapers take the information and ensure the context is understood by the Commander. Their role is to use their knowledge of the Commander to ensure information is presented in a way that guarantees his understanding.

- The Commander reviews the information presented and the courses of action developed and makes a decision.

If information from each phase has been properly managed, then the commander has all the information required to make a decision

Author's Biography

Ramberto Torruella is the Staff Knowledge Manager for CTF-70, Commander Battle Force Seventh Fleet, embarked aboard USS KITTY HAWK (CV-63), home ported in Yokosuka, Japan.

He graduated from the United States Naval Academy in 1992 with a Bachelor of Science in Physic and from Rensselaer Polytechnic Institute in 1999 with Master of Science in Computer Science.

He is a certified nuclear engineer and has served aboard three fast attack submarines in both the Atlantic and Pacific Fleets.

Ramberto currently resides in Zushi, Japan with his wife, Kristyne and their four children.